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MEASUREMENT OF SOME BIOMARKERS IN DIFFERENT ABO SYSTEM PATIENTS INFECTED WITH COVID- 19 IN BAGHDAD CITY

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Abstract

Background: People with blood type O are less likely to contract the coronavirus, while people with type A blood are more likely to contract COVID-19, according to several studies.
Aims: study there is an association between ABO and different ABO system patients infected with COVID- 19 in Baghdad City.
Methods: During the period from January 3, 2021, to December 22, 2021, all 83 patients (44 males and 39 females) were diagnosed with COVID-19 infection. SARS-COV-2 infection was diagnosed using the 2019-nCoV IgG/IgM COMBO test card. Also, serum Ferritin levels; Vitamin D3; C-reactive protein (CRP), ABO blood system, Lactate Dehydrogenase (LDH), and D- Dimer were estimated.
Results: The link between blood type and infection with the developing coronavirus in 83 Iraqi individuals was investigated. Patients with type A blood had the highest rate of infection with the Covid-19 virus. COVID-19 does not totally protect people with type O blood. Based on the data, it was determined that there is no link between the Covid-19 virus and other blood groups. This study found that, in addition to the ABO blood type, the RhD blood type has an impact on COVID-19 susceptibility.
Conclusion: The study found no evidence of a link between blood group and the severity of COVID-19 disease.
Keywords: ABO Blood System, RhD blood type, COVID-19.

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Introduction

COVID-19 is caused by infection with the Coronavirus (SARS-CoV-2), which appeared as an epidemic in a year in Wuhan, China, killing nearly one million people until October 2020 [1]. Many symptoms appear in people infected with the virus, the most important of which is a fever of 39 °C, dry cough, difficulty breathing, Blood clots in the lung and brain (Pulmonary and cerebral thrombosis), muscle pain, weakness, hair loss, and low white blood cells count [2, 3]. Several recent studies have focused on the relationship between blood types and COVID-19 and other factors such as ferritin, hormones, vitamin D3, gender, age, D-dimer, and C-Reactive Protein (CRP) [4, 5]. Few studies have shown that there is an association between RhD and susceptibility to infection with COVID-19, however, this relationship needs more studies in different ages, genders, and geographic areas, so the goal of the current study was focused on this aspect.

Materials and methods

Patients and Information Gathering: During the period from January 3, 2021, to December 22, 2021, all 83 patients (44 males and 39 females) were diagnosed with COVID-19 infection. The patients in this study had to be admitted to three Baghdad's Al-Kharkh private laboratories. All patients had a dry cough, fever, sweating, hair loss, and shortness of breath, especially at night. The age of the COVID-19 patients under study ranged from 10 to 89 years. Patients were chosen after a second infection with the Coronavirus (SARS-COV-2) caused substantial hair loss, overall weakness, nasal discharges, hoarseness, loss of smell, excessive perspiration, and loss of appetite.

Diagnostic tests used in the study:

- **Diagnosis of COVID-19 disease:** SARS-COV-2 infection was diagnosed using the 2019-nCoV IgG/IgM COMBO test card.
- Estimation of serum **Ferritin** levels (MAGLUMI Ferritin (CLIA), London, UK).
- Serum **Vitamin D3** (MAGLUMI Ferritin (CLIA), London, UK).
- Turkey's Archem diagnostics kit is used to assess **C-reactive protein (CRP)**.
- **ABO blood system**: Quality ABO Blood grouping Reagents Test Kit Manufacturer/ Monoclonal Anti Sera Blood Typing Test Suppliers- Maxwin, India was used.
- **Lactate Dehydrogenase (LDH)**: Biosystems S.A., Barcelona kit was used.
- **D- Dimer**: Biogenix kit INC. PVT. LTD. was used.

Analytical Statistics: The data are reported as mean standard deviation (SD) or the number of participants (n) (percent). The data was examined with the statistical program (SPSS), and p-values of less than 0.05 were considered significant.

Results and discussion:

Coronavirus was diagnosed in 83 patients as a second infection with the virus, 44 (53.01%) males and 39 (46.98%) females living in Baghdad city (Table 1). The results of the current study showed that the highest incidence of the disease was in men in the age groups 30-39 and 40-49, with a percentage ranging from 10 (22.72%), respectively, and the highest infection rate in women was in the age group 60-69, at a rate of 9 (23.07%) (Table 2).

Gender		Total (%)
F (%)	M (%)	
39 (46.98)	44 (53.01)	83 (100)

Table 1: Rates of COVID-19 infection in males and females

F: female; M: Male

Table 2: Infection rates of COVID-19 in various age groups

gender / Age(y)	Female (%)	Male (%)	Total (%)
10 – 19	2 (5.12)	3 (6.81)	5 (6.0)
20 - 29	8 (20.51)	9 (20.45)	17 (20.4)
30 - 39	7 (17.94)	10 (22.72)	17 (20.4)
40 - 49	4 (10.25)	10 (22.72)	14 (16.8)
50 - 59	3 (7.69)	5 (11.36)	8 (9.6)
60 - 69	9 (23.07)	5 (11.36)	14 (16.8)
70 - 79	4 (10.25)	2 (4.54)	6 (7.2)
80 - 89	2 (5.12)	0 (0)	2 (2.4)
Total (%)	39 (100)	44 (100)	83 (100)

Y: year

There is a close relationship between CRP levels with the degree of viral infection, and it is worth noting that CRP is not affected by physiological factors such as the patient's age and gender, so it is an important indicator of the levels of bacterial infections. As shown in Table 3, it was found that the levels of CRP and the rate of infection with Coronavirus were high in males compared to infected women. It was 40 (48.19%) and normal in only 4 patients (4.8%), while in women, the levels of protein were high in 33 women and by (39.75%), so the high levels of protein in patients was clear evidence of a viral infection. CRP can be stimulated by the complement, which enhances the process of phagocytosis, and this leads to ridding the body of viruses that invade and kill the body. CRP levels can be used as a guide for the early diagnosis of infectious lung viral infections [6, 7].

Table 3: CRP levels in COVID-19 patients

Gender				Total (%)
Female n=39		Male n=44		
High (%)	Normal (%)	High (%)	Normal (%)	
33 (39.75)	6 (7.22)	40 (48.19)	4 (4.8)	83 (100)

An enzyme has been found lactate dehydrogenase- LDH in both females and males is high, 32 (82.05%) and 36 (81.81%) respectively who are carriers of all different blood types (Table 4). While the percentage of ferritin was not high in both females and males, 14 (35.9%) and 14 (31.82%) respectively for all different blood groups (Table 5).

Table 4: LDH levels in COVID-19 patients

Gender				Total (%)
Female n=39		Male n=44		
High (%)	Normal (%)	High (%)	Normal (%)	
32 (82.05)	6 (17.94)	36 (81.81)	8 (18.18)	83 (100)

Table 5: ferritin levels in COVID-19 patients

Gender				Total (%)
Female n=39		Male n=44		
High (%)	Normal (%)	High (%)	Normal (%)	83 (100)
14 (35.9)	25 (64.10)	14 (31.82)	30 (68.18)	

D-dimer is part of the residue that appears in the blood significantly when the body tries to break down the clot, and over time, the D-dimer disappears from the blood, but if its levels are high, this indicates that a large clot was present in the body and did not break down full like in cases. The current study showed a very high level of D-dimer in all Covid 19 patients, women and men, as it was 33 (84.62%) and 38 (86.36%) respectively (Table 6).

Table 6: D- dimer levels in COVID-19 patients

Gender				Total (%)
Female n=39		Male n=44		
High (%)	Normal (%)	High (%)	Normal (%)	83 (100)
33 (84.62)	6 (15.38)	38 (86.36)	6 (13.64)	

Vitamin D deficiency was found in 32 (72.72%) of COVID-19 cases in men compared to 26 (66.66%) of the comparison group of women with the disease, meaning that this deficiency is more prevalent in men than in women (Table 7). It was found from the results of the current research that the highest rate of infection with COVID-19 was in patients with blood type O^+, with a rate of 33 (39.75%), followed by blood type AB^+ with a percentage of 18 (21.75%), and for blood types A^+ and B^+ with a percentage of 9 (10.8%), the least affected blood types were B^- with proportion 6 (7.2%) and AB^- 6 (7.2%), followed by O^- 2 (2.4%) (Table 8). The current study also showed that 69 (83.13%) carry the Rh factor and 14 (16.86%) do not carry the Rh factor.

Table 7: Vitamin D3 levels in COVID-19 patients

Gender				Total (%)
Female n=39		Male n=44		
Low (%)	Normal (%)	Low (%)	Normal (%)	83 (100)
26 (66.66)	13 (33.33)	32 (72.72)	12 (27.27)	

Table 8: Blood types in men and females in COVID-19 patients

Blood groups	N (%)
O^+	33(39.75)
AB^+	18(21.75)
A^+	9(10.8)
B^+	9(10.8)
B^-	6(7.2)
AB^-	6(7.2)
O^-	2(2.4)
Total (%)	83(100)

Human blood group antigens are among the most important antigens that may be associated with infection with COVID-19. Researchers Behboudi and others in Iran [8] found that out of a total of 148 coronavirus patients, 80 (54/1%) were men and 68 (45/9%) were women. Of these patients, 33 (22/6%) had blood type A positive, 44 (30/1%) had blood type B positive, 13 (8/9%) had AB positive type, and 36 (24/7%) O positive type. The researchers did not find significant differences between ABO blood groups, RH type, and the extent of infection with the virus at p-value = 0.392 and p-value = 0.847. However, the results of the current research do not agree with the results of researchers in Iran, which showed that the highest rate of infection with the disease was among patients with blood type B positive followed by type O positive, despite that, there is no association between blood type and RH type with infection with the disease COVID- 19. As for the researchers Majeed and others in 2021 in Iraq [9], they found that there is an association between the ABO blood group and some diseases such as hepatitis and malaria. Their study showed that people with blood type O^+ are less infected with the Coronavirus, while patients with blood type A^+ are more likely to be infected with COVID- 19, and this matches the results of the current study. In addition, patients who carry the rhesus factor are more likely to be infected with the virus compared to patients who have a blood type of RhD-. Therefore, there are many other factors that interfere with the disease, such as gender, race, age, chronic disease, the geographical area in which the patient resides, his profession, and the population of the area [8, 9]. The number of infected males was 3691 (65.2%) and in 1977 (34.8%) were females. The highest rate of infection was within the age group 21-30 years, 1781 (31.4%), followed by the age group 31-40 years, with a rate of 1221 (21.5%), which is consistent with the current study [9]. Abdulkhaliq *et al.*, 2022 [10] concluded that Females aged 30-39 years had the greatest rate of Coronavirus infection (28.20 percent), whereas males in the same age group had the highest rate (36.36 percent). In addition, 74 (74 percent), 68 (68 percent), and 18 (18 percent) of COVID-19 patients have ferritin, Vitamin D3, and zinc deficiencies, respectively. These findings are in line with the conclusions of the present study's researchers.

Researchers Ishaq *et al.*, discovered that 21 (48.8%) of COVID-19 patients had type O blood in 2021. The fatality rate in patients with blood type A was 13.9 percent, 9.5 percent in patients with blood type B, and 10.2 percent in patients with blood type AB. There was no significant difference between the blood groups [11]. The current study did not agree with the study of the Egyptian researcher, who found that the highest rate of infection with the disease was in patients aged above or equal to 50 years, at a rate of 48.3%, but the results of the current study agreed with the results of the researcher with regard to the fact that the most infections with the Coronavirus were in patients of different factions Their blood is A by 35.5%, especially in men [12]. Several Arab, Chinese, and American researchers have found that the frequency of type A blood increases greatly in COVID-19 individuals, while the incidence rates of type O blood decrease significantly, based on facts and statistics [13, 14,

15, 16]. Studies in Canada indicated that blood type A or AB was associated with COVID-19 compared to blood type O or B type [17]. In previous Iraqi studies conducted by a group of researchers, they found that susceptibility to infection with COVID-19 may be associated with type AB blood in patients from theBaghdad governorate, while blood type A was associated with an increased risk of death as a result of thrombosis and difficulty breathing [18, 19, 20].

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